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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/888,273	06/22/2001	David W. Burns	2207/ 11315	8639

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EXAMINER

MEONSKE, TONIA L

ART UNIT	PAPER NUMBER
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2183

DATE MAILED: 02/10/2004

7

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/888,273

Applicant(s)

BURNS ET AL.

Examiner

Tonia L Meonske

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 November 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5 and 6.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Specification

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Claim Objections

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 21 and 27 are objected to under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
4. Referring to claim 21, in line one, the limitation "said value", is indefinite. It is unclear whether Applicant is referring to "said value stored in the first starting counter" or to "said preliminary value". Appropriate correction is required.
5. Referring to claim 27, in line one, the limitation "the method" lacks an antecedent basis. Appropriate correction is required.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 4, 5, 6, 7, 8, 12, 15, 16, 20, 23, 24, 28, 13, 14, 21, 22, 29, and 30 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
8. In claim 4, beginning at line 2, the following claim limitation is indefinite:

“determining if a plurality of conditions are true, the conditions including

- if the processor is operating in a multithreaded processing mode;
- if the first thread has no instructions in an execution pipeline of said processor;

and

- if the first thread is attempting to fetch instructions from a memory.”

9. This claim limitation requires determining that at least two conditions are true. It is unclear if Applicant intended that the at least two conditions must only come from the list of three conditions listed in the claim. The way the claim is worded leads one to believe that determining any two true conditions, including those not listed in the claim, would read on the claims. Applicant must clarify the record for claim 4 as to whether the two conditions to be determined as true is only limited to the listed conditions. Furthermore, the same claim limitation is question appears in the following claims: 8, 12, 16, 20, 24, and 28. Appropriate correction is required for claims 4, 8, 12, 16, 20, 24, and 28. Furthermore, claims 5, 6, 13, 14, 21, 22, 29, and 30 depend from claims 4, 12, 20, and 28, and therefore claims 5, 6, 13, 14, 21, 22, 29, and 30 are defective for the same reasons as claims 4, 12, 20, and 28. Appropriate correction is also required for claims 5, 6, 13, 14, 21, 22, 29, and 30.

10. In claim 7, beginning at line 4, the following claim limitation is indefinite:

“assigning priority to said second thread in response to one of a plurality of conditions being true, the conditions including

- if the processing of the first thread retires an instruction from said first thread; and
- if there is not an indication of approaching instruction side starvation for said first thread.”

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11. This claim limitation requires determining that at least one condition is true. It is unclear if Applicant intended for the condition to only come from the list of two conditions listed in the claim. The way the claim is worded leads one to believe that determining any true condition, including a condition not specifically listed in the claim, would read on the claims. Applicant must clarify the record for claim 7 as to whether the condition to be determined as true is only limited to the listed conditions. Furthermore, the same claim limitation is question appears in the following claims: 15 and 23. Appropriate correction is required for claims 7, 15, and 23.

Claim Rejections - 35 USC § 102

12. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

13. Claims 1, 2, 3, 4, 7, 8, 9, 10, 11, 12, 15, 16, 17, 18, 19, 20, 23, 24, 25, 26, 27, and 28 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Sager, US Patent 6,542,921.

14. Referring to claim 1, Sager has taught in a multi-threaded processor for at least first and second threads, a method of assigning thread priority comprising:

- a. assigning priority to said first thread (abstract, Figure 9, element 909);
- b. loading a preliminary value to a thread precedence counter (abstract, Figure 9, element 905, "Priority Period"); and
- c. assigning priority to said second thread in response to expiration of said thread

precedence counter (abstract, Figure 9, element 917).

15. Claim 9 does not recite limitations above the claimed invention set forth in claim 1 and is therefore rejected for the same reasons set forth in the rejection of claim 1 above.

16. Referring to claim 2, Sager has taught the method of claim 1, as described above, and wherein said preliminary value is based on a value stored in a first starting counter associated with said first thread. (abstract, Figures 9 and 10, column 11, line 29-column12, line 63)

17. Claims 10, 18, and 26 do not recite limitations above the claimed invention set forth in claim 2 and are therefore rejected for the reasons set forth in the rejection of claim 2 above.

18. Referring to claim 3, Sager has taught the method of claim 2, as described above, and further comprising:

- a. determining if there is an indication of approaching instruction side starvation for said first thread (abstract, Figure 11, element 1117); and
- b. incrementing a value stored in said first starting counter in response to an indication of approaching instruction side starvation for said first thread (Figure 11, element 1121, column 9, lines 12-29).

19. Claims 11, 19, and 27 do not recite limitations above the claimed I nvention set forth in claim 3 and therefore are rejected for the same reasons set forth in the rejection of claim 3 above.

20. Referring to claim 4, Sager has taught the method of claim 3, as described above, and wherein determining if there is an indication of approaching instruction side starvation for said first thread includes determining if a plurality of conditions are true, the conditions including

- a. if the processor is operating in a multithreaded processing mode (Since the multithreaded processor is always operating in a multithreaded mode, the processor will

always be determined to be operating in the Multithreaded mode.);

b. if the first thread has no instructions in an execution pipeline of said processor (Sager has not specifically taught this limitation, however, the claim does not require that all three elements are true.); and

c. if the first thread is attempting to fetch instructions from a memory (Column 1, lines 25-37).

21. Claims 12, 20, and 28 do not recite limitations above the claimed invention set forth in claim 4 and therefore are rejected for the same reasons set forth in the rejection of claim 4 above.

22. Referring to claim 7, Sager has taught in a multi-threaded processor to handle processing of at least first and second threads, a method of assigning thread priority comprising:

a. assigning priority to said first thread (Figure 9, element 909); and

b. assigning priority to said second thread (Figure 9, element 917) in response to one

of the plurality of conditions being true, the conditions including

i. if processing of said first thread retires an instruction from said first thread; and

ii. if there is not an indication of approaching instruction side starvation for said first thread (Figure 9, elements 913 and 917, When the priority of the second thread is assigned in response to only the current priority period expiring, element 913, the condition is true that there is not an indication of approaching instruction side starvation for said thread.).

23. Referring to claim 8, Sager has taught the method of claim 7, as described above, and wherein said indication of approaching instruction side starvation for said first thread includes a

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plurality of conditions being true, the conditions including

- a. if the processor is operating in a multithreaded processing mode (This condition is always true in Sager.);
- b. if the first thread has no instructions in an execution pipeline of said processor (This condition is not true in the instance of Sager when the priority for the second thread is based solely on the current priority period expiring.); and
- c. if the first thread is attempting to fetch instructions from a memory (This condition is not true in the instance of Sager when the priority for the second thread is based solely on the current priority period expiring.).

24. Again, since Sager assigns the priority to a second thread based solely in this case on the current priority period expiring, then at least two of the above conditions are not true, and therefore that means there is not an indication of instruction side starvation.

25. Claims 15 and 23 do not recite limitations above the claimed invention set forth in claim 7 and are therefore rejected for the same reasons set forth in the rejection of claim 7 above.

26. Claims 16 and 24 do not recite limitations above the claimed invention set forth in claim 8 and are therefore rejected for the same reasons set forth in the rejection of claim 8 above.

27. Referring to claim 17, Sager has taught a computer system to handle processing of at least first and second threads in parallel, comprising:

- a. a memory to store instructions for first and second threads (Figure 1, column 4, lines 7-15);
- b. a processor including
 - i. control logic coupled to said memory to assign priority between said first

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and second threads (abstract, Figure 9, Figure 13, element 1301);

ii. a thread precedence counter coupled to said control logic wherein priority is assigned to said second thread after said thread precedence counter expires (abstract, Figure 9, element 905, element 917, "Priority Period").

28. Claim 25 does not recite limitations above the claimed invention set forth in claim 17 and is therefore rejected for the same reasons set forth in the rejection of claim 17 above.

Claim Rejections - 35 USC § 103

29. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

30. Claim 5, 13, 21, and 29 ARE rejected under 35 U.S.C. 103(a) as being unpatentable over Sager, WO 01/04750 A1, cited as a prior art reference in paper number 6, filed on November 8, 2002, in view of Jacobsen et al., US Patent 6,606,639.

31. Referring to claim 5, Sager has taught the method of claim 4, as described above. Sager has not specifically taught wherein when incrementing the value stored in the first starting counter, said value is incremented geometrically. However, Jacobsen et al. has taught that the timer interval could be doubled if the timer interval is expected to be expanded (Jacobsen, Column 4, lines 47-50, Doubling is a form of geometric progression.). Therefore it would have been obvious one of ordinary skill in the art at the time the invention was made to have the timer

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interval, of Sager, double, as taught by Jacobsen et al., as the timer interval of Sager is expected to be expanded for the desirable purpose of allowing longer threads to complete execution.

32. Claims 13, 21, and 29 do not recite limitations above the claimed invention set forth in claim 5 and therefore are rejected for the same reasons set forth in the rejection of claim 5 above.

33. Claim 6, 14, 22, and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sager, WO 01/04750 A1, cited as a prior art reference in paper number 6, filed on November 8, 2002, in view of Jacobsen et al., US Patent 6,606,639 and Roubinet et al., US Patent 6,404,161.

34. Referring to claim 6, Sager in combination with Jacobsen have taught the method of claim 5, as described above. They have not specifically taught wherein said value is incremented geometrically by left-shifting a binary 1 bit into said value. However, Roubinet et al. have taught that when the time interval needs doubling, this task can easily be performed by left-shifting, either a zero or a one, in said value (Roubinet et al., column 11, lines 38-49). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have the timer interval double, or geometrically progress, by left-shifting a binary 1 bit into said value, as taught by Roubinet et al., as left shifting is the easiest method of doubling a timer bit value.

35. Claims 14, 22, and 30 do not recite limitations above the claimed invention set forth in claim 6 and therefore are rejected for the same reasons set forth in the rejection of claim 6 above.

Conclusion

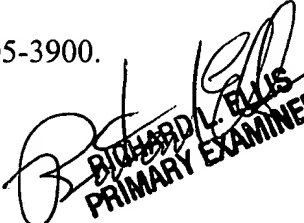
36. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tonia L Meonske whose telephone number is (703) 305-3993.

The examiner can normally be reached on Monday-Friday, 9-6:30.

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37. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie P Chan can be reached on (703) 305-9712. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

38. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.


RICHARD L. ELLIS
PRIMARY EXAMINER

tlm